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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/076,698

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Junichi Kinoshita

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7590

10/01/2004

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EXAMINER

FLORES RUIZ, DELMA R


ART UNIT

PAPER NUMBER

2828

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/076,698	<b>Applicant(s)</b> KINOSHITA, JUNICHI	
	<b>Examiner</b> Delma R. Flores Ruiz	<b>Art Unit</b> 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Chow et al (5,712,865).

***Regarding claim 1***, Chow discloses a surface emitting laser comprising: a semiconductor substrate (see Figs. 1, Character 12); active layer (see Figs. 1, Character 18 and 20) on a first major surface of said semiconductor substrate (see Figs. 1, Characters 12) and one or more reflective (see Fig. 1, Characters 14 and 16) or diffractive optical elements formed on a substrate or superstrate side of the active layer for exciting resonance of light in the active layer in a direction substantially normal to said major surface of said substrate, said active layer having planar side surfaces (see Claim 10) which are offset from vertical planes normal to said major surface of said semiconductor substrate to prevent in-plane horizontal resonance of light in said active

layer (see Figs. 1, Abstract, Column 4, Lines 9 – 67, Column 5, Lines 1 – 67 and Column 6, Lines 1 – 58).

**Regarding claim 2,** Chow discloses a semiconductor substrate (see Fig. 1, Character 12); active layer (see Figs. 1, Character 18 and 20) on a first major surface of said semiconductor substrate (see Figs. 1, Characters 12); a first optical reflector (see Figs. 1, Character 14) interposed between said semiconductor substrate (see Fig. 1, Character 12) and said active layer (see Figs. 1, Character 18 and 20); and a second optical reflector (see Figs. 1, Character 16) provided on a superstrate side of said active layer, said first and second optical reflectors exciting resonance of light in said active layer in a direction substantially normal to the major surface of said substrate (see Figs. 1, Abstract, Column 4, Lines 9 – 67, Column 5, Lines 1 – 67 and Column 6, Lines 1 – 58), said active layer having side surfaces at the longitudinal ends of the active, layer the side surfaces of said active layer offset from vertical planes normal to the major surface of said semiconductor substrate (see Figs. 1, Abstract, Column 4, Lines 9 – 67, Column 5, Lines 1 – 67, Column 6, Lines 1 – 58, and Column 8, Lines 14 – 32).

**Regarding claim 5,** Chow discloses side surfaces of said active layer are made by cleavage (see Fig. 1).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 4, are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al (5,712,865) in view of Kondow et al (5,912,913).

***Regarding claim 3,*** Chow discloses the claimed invention except for semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Regarding claims 4,** Chow discloses the claimed invention except for substrate and said active layer and waveguide layer are made of semiconductors having a zincblend crystalline structure, said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than  $3^{\circ}$  from the [100] plane. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zinc blend structured crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. It would have been obvious to one of ordinary skill in the art at the time the invention was made to said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than  $3^{\circ}$  from the [100] plane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. However, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. Therefor, the Applicant is discovering the optimum or workable range of the discloses prior art.

Claims 6, is rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al (5,712,865) in view of Furukawa et al (6,507,594).

**Regarding claim 6,** Chow discloses the claimed invention except for anti-reflection dielectric thin film is coated onto said side surface of said active layer. It would have been obvious at the time of applicant's invention, to combine Furukawa of teaching a anti-reflection dielectric thin film is coated onto said side surface of said active layer with laser because anti-reflection is a layer of material of lower refractive index of just the right thickness (1/4 wave) is deposited on the optical surface to be coated. More complex coatings are possible which cover a large wavelength range.

Claims 7, 10, 11, 14, 15, 16, is rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al (5,712,865) in view of Furukawa et al (6,507,594), further in view of Kinoshita (4,958,357).

**Regarding claim 7,** Chow discloses the claimed invention except for a waveguide layer provided on said first major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said

substrate. It would have been obvious at the time of applicant's invention, to combine Furukawa in view of Kinoshita of teaching a waveguide layer provided on said first major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction being offset from vertical planes normal to said first major surface of said substrate with laser because a grating is provided along the waveguide structure, and Bragg diffraction from the grating is used for optical feedback. Because of wavelength selectivity in accordance with the period of the grating, DFB lasers are capable of oscillating in a single longitudinal mode. DFB lasers having 2nd-order gratings are capable of emitting radiation mode light normal to the waveguide direction. A surface emitting laser comprising 2<sup>nd</sup> order grating along the waveguide direction for obtaining a beam with high directivity (Kinoshita (abstract)).

***Regarding claim 10,*** Chow discloses the facets of said active layer made by cleavage (see Fig. 1).

***Regarding claim 11,*** Chow discloses a cladding layer (see Figs. 1A-B, Character 106) provided on said waveguide layer; and an electrode (see Figs. 1A-B, Character 110) provided on said cladding layer, said cladding layer being selectively made in a central part of said laser to form a ridge stripe, said electrode being



electrically connected above said ridge stripe but electrically insulated near facets at opposite ends of said ridge stripe (see Figs. 1 A-B).

**Regarding claim 14,** Chow discloses facets (see Fig. 1A Characters 111A and 111B) of said active layer (see Fig. 1A Character 104) and said facets of said waveguide layer are made by cleavage (Column 6, Lines 10 – 39).

**Regarding claim 16,** Chow discloses the claimed invention except for anti-reflection a dielectric thin film is coated onto said side surface of said active layer. It would have been obvious at the time of applicant's invention, to combine Furukawa of teaching a anti-reflection a dielectric thin film is coated onto said side surface of said active layer with laser because anti-reflection is a layer of material of lower refractive index of just the right thickness ( $1/4$  wave) is deposited on the optical surface to be coated. More complex coatings are possible which cover a large wavelength range.

**Regarding claims 17, and 19,** Chow discloses the claimed invention except for a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction. It would have been obvious at the time of applicant's invention, to combine Furukawa iv

view of Kinoshita of teaching a waveguide layer provided on said major surface of said semiconductor substrate and having formed 2nd-order gratings along the waveguide direction, facets of said active layer and facets of said waveguide layer at opposite ends in the waveguide direction with laser because a grating is provided along the waveguide structure, and Bragg diffraction from the grating is used for optical feedback, because of wavelength selectivity in accordance with the period of the grating, DFB lasers are capable of oscillating in a single longitudinal mode. DFB lasers having 2nd-order gratings are capable of emitting radiation mode light normal to the waveguide direction. A surface emitting laser comprising 2<sup>nd</sup> order grating along the waveguide direction for obtaining a beam with high directivity (Kinoshita (abstract)).

***Regarding claim 18,*** Chow discloses waveguide direction being offset by an angle other than 45° from any of the sides of the substantial rectangle, (Column 6, Lines 10 – 30).

Claims 8, 9, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al (5,712,865), in view of Furukawa et al (6,507,594), further in view of Kondow et al (5,912,913).

***Regarding claims 8, 12 and 13*** Chow in view of Furukawa discloses the claimed invention except for semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

***Regarding claim 9,*** Chow in view of Furukawa discloses the claimed invention except for substrate and said active layer and waveguide layer are made of semiconductors having a zincblend crystalline structure, said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than  $3^{\circ}$  from the [100] plane. It would have been obvious at the time of applicant's invention, to combine Kondow of teaching a semiconductor substrate and said active layer are made of semiconductors having a zincblend crystalline structure with laser because it would have been obvious to one having ordinary skill in the art at the time the invention was made to semiconductor substrate and said active layer are made of

semiconductors having a zincblend crystalline structure (Column 4, Line 51 – 65), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416. It would have been obvious to one of ordinary skill in the art at the time the invention was made to said first major surface of said semiconductor substrate having a surface orientation slanted by an angle not less than  $3^{\circ}$  from the [100] plane, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. However, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. Therefor, the Applicant is discovering the optimum or workable range of the discloses prior art.

Claim 20, is rejected under 35 U.S.C. 103(a) as being unpatentable over Chow et al (5,712,865) in view of Lebby et al ((5,498,883)

**Regarding claim 20**, Chow discloses a surface emitting laser comprising: a semiconductor substrate (see Figs. 1, Character 12); active layer (see Figs. 1 , Character 18 and 20) on a first major surface of said semiconductor substrate (see Figs. 1, Characters 12) and one or more reflective (see Fig. 1, Characters 14 and 16)

or diffractive optical elements formed on a substrate or superstrate side of the active layer for exciting resonance of light in the active layer in a direction substantially normal to said major surface of said substrate, said active layer having planar side surfaces (see Claim 10) which are offset from vertical planes normal to said major surface of said semiconductor substrate to prevent in-plane horizontal resonance of light in said active layer (see Figs. 1, Abstract, Column 4, Lines 9 – 67, Column 5, Lines 1 – 67 and Column 6, Lines 1 – 58). Chow discloses the claimed invention except for a supporting member; a surface-emitting laser mounted on said supporting member; and a packaging member enveloping said surface emitting laser. It would have been obvious at the time of applicant's invention, to combine Leebby of teaching a supporting member; a surface emitting laser mounted on said supporting member; and a packaging member enveloping said surface emitting laser with laser because the supporting member use to support a laser and a packaging member is used to protect the laser of the environment (example; temperature, dust, etc).

### ***Response to Arguments***

Applicant's arguments filed 6/21/2004 have been fully considered but they are not persuasive. Applicant's arguments with respect to claims 1 - 20 have been considered but are moot in view of the new ground(s) of rejection. Applicants

amendments raised new issues that made necessary the new art to be applied and therefore, the arguments presented against Jiang et al (6,339,607) are said to be moot due to the new grounds of rejection. Applicant's amendments have been fully addressed by the above-presented rejection

### ***Conclusion***


Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delma R. Flores Ruiz whose telephone number is (571) 272-1940. The examiner can normally be reached on M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on (571) -272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Delma R. Flores Ruiz  
Examiner  
Art Unit 2828

  
Min Sun Harvey  
Supervisor Patent Examiner  
Art Unit 2828

DRFR/MH  
September 21, 2004